63d Congress, 2d Session. } HOUSE OF REPRESENTATIVES. { Document No. 1176.

LAKE RIVER AND BACHELORS SLOUGH, WASH.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS ON PRELIMINARY EXAMINATION AND SURVEY OF LAKE RIVER, INCLUDING BACHELORS SLOUGH, WASH.

October 15, 1914.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with illustration.

War Department,
Washington, October 14, 1914.

The Speaker of the House of Representatives.

Sir: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated 13th instant, together with copies of reports from Maj. J. F. McIndoe and Lieut. Col. C. H. McKinstry, Corps of Engineers, dated November 22, 1913, and May 26, 1914, with map, on preliminary examination and survey, respectively, of Lake River, including Bachelors Slough, Wash., made in compliance with the provisions of the river and harbor act approved March 4, 1913.

Very respectfully,

Lindley M. Garrison,
Secretary of War.

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War Department,
Office of the Chief of Engineers,
Washington, October 13, 1914.

From: The Chief of Engineers, United States Army.
To: The Secretary of War.
Subject: Preliminary examination and survey of Lake River, including Bachelors Slough, Wash.

1. There are submitted herewith, for transmission to Congress, report dated November 22, 1913, by Maj. J. F. McIndoe, Corps of Engineers, and report dated May 26, 1914, with map, by Lieut. Col. C. H. McKinstry, Corps of Engineers, on preliminary examination and survey, respectively, of Lake River, including Bachelors Slough, Wash., authorized by the river and harbor act approved March 4, 1913.

2. Lake River is a tributary of Columbia River, which it enters near the mouth of Lewis River about 26 miles below Portland, Oreg. It has a total length of about 11 miles. Ridgefield, about 3 miles above the mouth, is the head of regular steamboat navigation. Below this point there is a low-water depth of not less than 6 feet except at the mouth, where the depth is about 3½ feet. Bachelors Slough, a secondary channel of the Columbia River, leaves that river about 3½ miles above the mouth of Lake River, and flowing in a northeasterly direction for about 3 miles empties into Lake River about 1½ miles above the mouth of the latter stream. The obstructions to navigation on the slough are snags and several shoals, over which there is a depth of about 1 foot at mean low water. Boats plying between Portland and points on Lake River and Lewis River habitually use the slough when the stage of water permits. The district officer submits a plan providing for a channel in Lake River 50 feet wide and 6 feet deep at low water, and a channel in Bachelors Slough 50 feet wide and 4 feet deep at low water, with necessary snagging, at an estimated cost of $4,850, the cost of the two improvements separately being approximately $1,600 for Lake River and $3,250 for Bachelors Slough. He expresses the opinion that the locality is worthy of improvement to this extent.

3. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith dated September 15, 1914. From its study of the subject, the board reaches the conclusion that the cost of the work in Bachelors Slough is excessive when compared with the probable resulting benefits, and that a channel through this slough, while convenient, is not essential for the boats engaged in traffic on Lake River, as that stream is accessible at its mouth from the Columbia River. The board concurs with the district officer, however, in the opinion that it is advisable to undertake the improvement of Lake River, in the manner proposed, at an estimated cost of $1,600.

4. After due consideration of the above-mentioned reports, I concur with the views of the Board of Engineers for Rivers and Harbors, and therefore report that the improvement by the United States of Lake River, Wash., is deemed advisable to the extent of providing a channel 50 feet wide and 6 feet deep at low water, from the mouth to Ridgefield, at an estmiated cost of $1,600 for first construction and $500 annually for maintenance. The full amount of the estimate

should be provided in one appropriation. The improvement of Bachelors Slough in the manner apparently desired is not deemed advisable at the present time.

Dan C. Kingman,
Chief of Engineers, United States Army.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS ON SURVEY.

[Second indorsement.]

The Board of Engineers for Rivers and Harbors,
September 15, 1914.

To the Chief of Engineers, United States Army:

1. The following is in review of the district officer's reports on preliminary examination and survey of Lake River, including Bachelors Slough, Wash., submitted under authority of the act of March 4, 1913.

2. Lake River empties into the Columbia River about 14 miles below the mouth of the Willamette. It has a length of about 11 miles and is subject during low stages to a tidal oscillation of about 2 feet at the mouth. The depth is ample for navigation, except near the mouth, where it is only about 3½ feet at low water.

3. Bachelors Slough is a secondary channel of the Columbia River flowing around Bachelors Island and emptying into Lake River about 1½ miles above its mouth. The obstructions to navigation are snags and several shoals, over which there is a depth of about 1 foot at low water. The banks of the slough are occupied, and boats stop at several landings. Boats operating between Portland and points on Lake River and on Lewis River habitually use the slough when the stage of water permits.

4. The exact amount of commerce to be benefited by improvement is not known, but it is estimated that about 28,000 tons are carried through Bachelors Slough and Lake River annually. The same character of navigation is required on the Lake River up to Ridgeville as exists on the lower Lewis River and requires a depth of 6 feet, while on Bachelors Slough a depth of 4 feet will suffice.

5. An estimate for a channel 50 feet wide and 6 feet deep at low water in Lake River and 50 feet wide and 4 feet deep in Bachelors Slough, with the necessary snagging, is given in the sum of $4,850, the relative cost of the two improvements being approximately $1,600 for Lake River and $3,250 for Bachelors Slough. The cost of maintenance is placed at $1,000 annually. The district officer, who is also division engineer, believes the locality is worthy of improvement to this extent.

6. The board's study of this improvement led it to the conclusion that the cost of the work in Bachelors Slough was excessive when compared with the probable resulting benefits; that a channel through this waterway, while convenient, was not essential for the boats engaged in traffic on Lake River, as that stream is accessible at its mouth from the Columbia River; and that it would not be a hardship to the people living on the banks of the slough to haul to a landing on Lake River or on deep water in the slough. It seemed desirable, however, to improve the mouth of Lake River.

7. Interested parties were advised of the views of the board and given an opportunity of submitting statements or arguments bearing upon the questions involved, but no communications on the subject have been received.

8. Through boats operating on the Columbia River between Portland and points on Lake River and on Lewis River are unable during periods of low tide to enter or depart from Lake River on account of the shallow water on the bar, and the improvement most needed is the removal of this obstruction so that the boat service may be on schedule time. The amount involved in this work is not large, and it is believed that general commerce and navigation would be sufficiently benefited by the improvement to justify its cost. It is not thought that commensurate returns would result from the improvement of Bachelors Slough.

9. In view of the foregoing the board reports that in its opinion it is advisable for the United States to undertake the improvement of the mouth of Lake River, Wash., as proposed by the district officer, at an estimated first cost of approximately $1,600 and $500 annually for maintenance. The whole amount should be made available in one appropriation.

10. In compliance with law, the board reports that there are no questions of terminal facilities, waterpower, or other subjects so related to the project proposed that they may be coordinated therewith to lessen the cost and compensate the Government for expenditures made in the interests of navigation.

For the board:

FREDERIC V. ABBOT,
Colonel, Corps of Engineers,
Senior Member Present.

PRELIMINARY EXAMINATION OF LAKE RIVER AND BACHELORS SLOUGH, WASH.

U. S. ENGINEER OFFICE, SECOND DISTRICT,
Portland, Oreg., November 22, 1913.

From: The District Engineer Officer.
To: The Chief of Engineers, United States Army
(Through the Division Engineer).
Subject: Preliminary examination, Lake River, Wash.

In compliance with department letter of March 18, 1913, the following report is submitted on the preliminary examination of Lake River, including Bachelors Slough, Wash., provided for in the river and harbor act approved March 4, 1913.

Lake River empties into the Columbia River near the mouth of Lewis River, about 14 miles below the mouth of the Willamette River and 26 miles from the city of Portland. The total length from Vancouver Lake at the head is about 11 miles. At mean low water it averages in width about 75 feet at the head and about 300 feet at the mouth. The banks are of clay and loam, fairly stable, and are from 10 to 14 feet in height above low water. From Vancouver Lake the river flows in a northwesterly direction about 2½ miles to within about one-half mile of the Columbia River, then northerly and parallel with the Columbia River 2½ miles, then northeasterly 3 miles, and northwesterly about 3 miles to the mouth. Several small creeks empty into the river along the right bank, but the stream generally is sluggish, due to the effect of tidal flow in the Columbia River. The average variation of water level at mean low water due to tide is about 2 feet at the mouth.

Above Ridgefield there are numerous short bends, snags, and several shoals, over which there is a minimum depth of about 1 foot; below Ridgefield there is a low-water depth of not less than 6 feet, except at the junction with Bachelors Slough and the mouth of the river, where there is a depth of about 3½ feet.

Bachelors Slough, a secondary channel of the Columbia River, leaves the Columbia about 3½ miles above the mouth of Lake River and flows in a northeasterly direction for about 3 miles and empties into Lake River about 1½ miles above the mouth. The width of the slough at mean low water averages about 150 feet; the banks are of clay and loam and well protected from erosion with a good growth of vegetation. The obstructions to navigation are snags and several sand shoals, over which a depth of about 1 foot at mean low water can be carried.

The land along the right bank of Lake River, except near the mouth, rises to an elevation of about 100 to 150 feet above the river. The surrounding territory is a prosperous and well-settled community. From Vancouver Lake to Bachelors Slough the land adjacent to the left bank is low and swampy, with numerous shallow lakes formed by the backwater from the Columbia River. During the annual freshet, in May, June, and July, the greater portion of this tract is overflowed. The land is used principally for grazing and dairying purposes. The main line of the Northern Pacific Railway from Portland to Puget Sound runs along the face of the hills and from Felida, at the head of Lake River, parallels the river to Ridgefield, a distance of about 8 miles.

Bachelors Island, area approximately 2,000 acres, is low and swampy along the Columbia River, but rises gently to Bachelors Slough and Lake River. During extreme high water the island is partially submerged. The soil is fertile and very productive, and the land adjacent to Bachelors Slough and Lake River is cultivated and used extensively for dairying purposes, for raising of small fruits, and general agricultural products. The settlers on the island have built their homes and other improvements along the high ground bordering on the slough and are dependent on the boats for transportation facilities.

Ridgefield, 14 miles from Vancouver, Wash., on the main line of the Northern Pacific Railway and 2½ miles above the mouth of Lake River, is the distributing point for the surrounding territory and the head of navigation for the regular steamboat service, although trips are made occasionally to private landings farther upstream. During the low stage of water on the East Fork of Lewis River freight to and from La Center is frequently hauled by team through Ridgefield. Above Ridgefield the river is used principally for rafting logs and by towboats and launches. The logs are hauled by rail from the logging camps to Felida, where they are boomed and rafted and then towed to points on the Columbia and Willamette Rivers.

The Lewis River Navigation Co., of Portland, Oreg., maintains a daily or triweekly steamboat service, according to the stage of water, through Bachelors Slough and Lake River to Woodland on the North Fork of Lewis River, making way landings along the slough and at Ridgefield. In addition to this service two gasoline boats carrying freight and passengers operate through Bachelors Slough and Lake River between Portland and La Center on the East Fork of Lewis River. The steamboats are of the stern-wheel type, about 150 feet long, 30 feet beam, and from 2 to 6 feet draft.

It is stated that steamboats operating to Lake River and Lewis River points always have used Bachelors Slough and Lake River when the stage of water would permit, as the distance to Ridgefield by this route is reduced by about 3 miles. A draft of 4 feet could formerly be carried on both streams except for about two months each year during extreme low water; but this draft now is possible only during the higher stages of water, and in order to meet the local demands and maintain a regular steamboat service the size and draft of the boats have been reduced to conform with the existing navigable conditions. A survey of Bachelors Slough and the lower portion of Lake River, made by the United States Coast and Geodetic Survey between the years 1877 and 1886 (chart 6144), indicates at that time a channel depth at the mean of the lowest low waters of 6½ feet and 5 feet, respectively.

Freight to and from Ridgefield consists of general merchandise and agricultural products; but definite commercial statistics are not available. From a statement by a representative of the steamboat company it is estimated that the annual tonnage to and from Ridgefield would average about 5,000 tons, which, together with the freight to and from Lewis River points, would average about 28,000 tons carried annually through Bachelors Slough and Lake River. On Lake River, near Ridgefield, a new sawmill is nearing completion. The greater portion of the output will, it is expected, be carried by boat. Large quantities of ties are towed annually from the Lewis River and other points to Ridgefield for shipment by rail. The shipments under contract for the present year will be, it is stated, approximately 500,000 ties (45,000 tons), valued at $225,000, and the logs annually towed out of Lake River are estimated to be about 50,000,000 feet b. m. (100,000 tons), valued at $500,000.

The terminal facilities are in general natural landings or inexpensive wharves and are deemed adequate for the present and future demands of commerce. At Ridgefield the dock and warehouse are owned by the Lewis River Navigation Co., and a landing wharf for independent boats is owned by the town of Ridgefield. Rail and boat terminals do not connect, as only local freight is carried on the boats.

There is no water-power development which could be coordinated to advantage with any plan of improvement of Lake River and Bachelors Slough.

An improved waterway in Bachelors Slough and Lake River from the mouth to Ridgefield would be a benefit to navigation and afford better transportation facilities to the settlers on Bachelors Island. In view of the amount of freight annually carried on the streams, which it is reasonable to assume will be materially increased with the improvement of Lewis River, and the further fact that Bachelors

Slough and Lake River always have been used by the boats operating to Lewis River and Lake River points, it is my opinion that Bachelors Slough and Lake River from the mouth to Ridgefield are worthy of improvement by the United States.

Data upon which to base an estimate of cost of improvement are not available and a survey is recommended.

Accompanying this report is a sketch map[1] of Lake River, Bachelors Slough, and vicinity.

J. F. McIndoe,
Major, Corps of Engineers.

[First indorsement.]

United States Engineer Office,
Northern Pacific Division,
San Francisco, Cal., November 25, 1913.

To the Chief of Engineers, United States Army:

1. Concurring in the views expressed by the district officer.

Thos. H. Rees,
Lieut. Col., Corps of Engineers,
Division Engineer.

[Third indorsement.]

The Board of Engineers for Rivers and Harbors,
December 16, 1913.

To the Chief of Engineers, United States Army:

For reasons stated herein, the board concurs with the district officer and the division engineer in recommending a survey in order to determine the extent and advisability of the improvement.

For the board:

Frederic V. Abbot,
Colonel, Corps of Engineers,
Senior Member Present.

SURVEY OF LAKE RIVER AND BACHELORS SLOUGH, WASH.

U. S. Engineer Office, Second District,
Portland, Oreg., May 26, 1914.

From: The District Engineer Officer.
To: The Chief of Engineers, United States Army.
Subject: Survey, with estimate of cost of improvement, of Lake River and Bachelors Slough, Wash.

This is report on survey of Lake River, including Bachelors Slough, Wash., with plan and estimate of cost of improvement and maintenance, directed by letter from office of the Chief of Engineers dated December 24, 1913, in pursuance of the river and harbor act of March 4, 1913.

A stadia survey was made in March, 1914, of Lake River from the mouth to Ridgefield, about 2¾ miles, and of Bachelors Slough, also about 2¾ miles. Map of the survey is herewith. The low-water slope of Lake River from Ridgefield down, and of Bachelor Slough is practically nothing. At low water the rise and fall of the tide averages about 2 feet. "Low water" as used herein is low water of the Columbia River at the mouth of Lake River, and is 11.3 feet below the Warrior Rock bench mark.

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[1] Not printed.

Lake River between the mouth and Ridgefield has an average width of about 350 feet. The banks vary in height from 10 to 21 feet, are of clay with several feet of top soil, fairly stable, and free from serious erosion.

The soundings indicate depths of water ranging from 7 to 36 feet, except near the mouth where there is a shoal over which there is a depth of about 3½ feet at low water.

Bachelors Slough, about 250 feet in width, leaves the Columbia River about 4 miles above the mouth of Lake River, flows northeasterly, and empties into Lake River about halfway between the mouth and Ridgefield. The banks are somewhat similar to the banks of Lake River and generally are well protected with a good growth of vegetation. In Bachelors Slough the governing depth is about 1 foot at low water, and the channel is obstructed by numerous snags.

The improvement which seemed advisable at the time of the preliminary examination was to obtain channels 50 feet wide and 6 feet deep in Lake River as far up as Ridgefield, and in Bachelors Slough, provided the cost should prove to be reasonable.

On the Lewis River, between its mouth and the forks, where conditions and requirements are similar to those on Lake River between its mouth and Ridgefield, the adopted project is for a 6-foot depth. The navigation conditions on Bachelors Slough are similar to those on the Lewis River above the forks, where the project is for 4 feet on the east branch to La Center and 4 feet on the north branch to Woodland. (See vicinity map on tracing herewith.)

To obtain a channel in Lake River from its mouth to Ridgefield 6 feet in depth at low water and 50 feet wide will require a small amount of dredging at its mouth. Such a channel will accommodate the type of vessels used in towing log rafts in this and neighboring waters, and should be provided.

To provide a channel 6 feet deep and 50 feet wide throughout the length of Bachelors Slough would require extensive snagging operations and the removal of about 45,000 cubic yards of material; maintenance also would be expensive. In view of the cost, this improvement is inadvisable. The removal of snags and the dredging of a channel 50 feet wide and 4 feet deep will meet present and immediately prospective demands of commerce and is warranted.

Estimate of cost.

Lake River: Dredging a channel 50 feet wide, 6 feet deep, 4,500 cubic yards, at 20 cents per cubic yard	$900
Bachelors Slough:	
Dredging a channel 50 feet wide, 4 feet deep, 12,500 cubic yards, at 20 cents per cubic yard	2,500
Snagging	1,000
	4,400
Engineering, contingencies, etc	450
Total	4,850

On account of the sediment and débris deposited during the annual freshets, dredging and snagging will be necessary to maintain the proposed depths. It is estimated that with the expenditure of approximately $1,000 annually, the proposed depths can be maintained.

As stated in the report on preliminary examination, existing terminal facilities are adequate for the present and future demands of commerce, and there is no water-power development which could be coordinated to advantage with any plan of improvement of Lake River and Bachelors Slough.

In view of the reasonable cost of the work, the present and prospective demands of commerce, and the benefit to the settlers on Bachelors Island who are dependent on the boats for transportation facilities, it is my opinion that Lake River from the mouth to Ridgefield, and Bachelors Slough are worthy of improvement by the General Government to the extent indicated.

The work should be prosecuted and completed during the low-water season, and the total amount should be provided in the initial appropriation if the project is adopted by Congress.

C. H. McKinstry,
Lieut. Col., Corps of Engineers.

[For Report of the Board of Engineers for Rivers and Harbors on survey see p. 3.]

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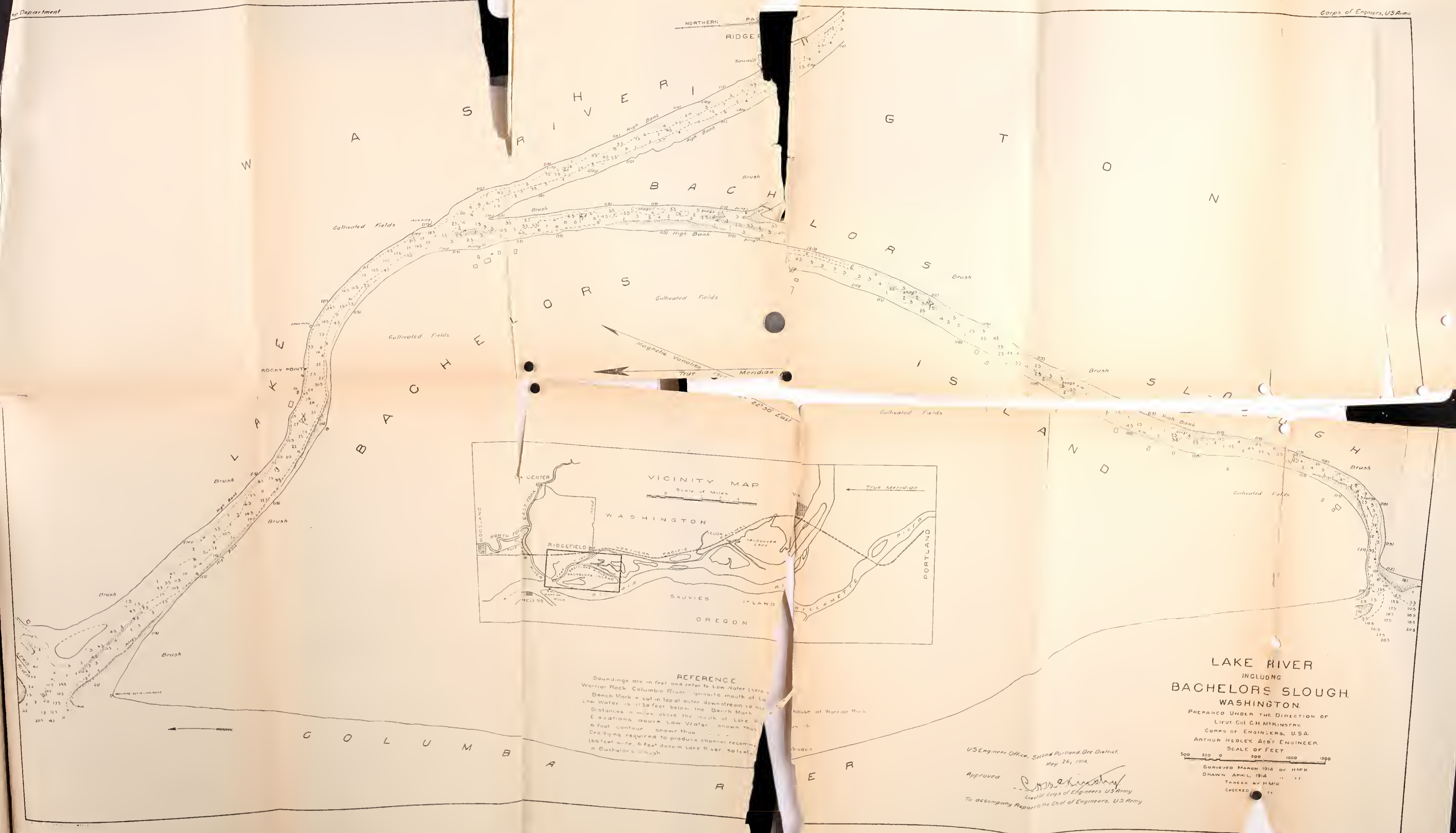
Corps of Engineers, U.S. Army



REFERENCE

Soundings are in feet and refer to Low Water (zero o
Warrior Rock Columbia River opposite mouth of La
Bench Mark + cut in top of outer downstream co
Low Water is 11.30 feet below the Bench Mark
house at Warrior Rock
Distances in miles above the mouth of Lake R
Elevations above Low Water shown thus
6 foot contour shown thus - - -
Dredging required to produce channel recomme
(60 feet wide, 6 feet deep in Lake River, 50 feet,
shaded
in Bachelors Slough

LAKE RIVER
INCLUDING
BACHELORS SLOUGH,
WASHINGTON.

Prepared Under the Direction of
Lieut. Col. C.H. McKinstry,
Corps of Engineers, U.S.A.
Arthur Hedley, Ass't Engineer.

Scale of Feet
500 200 0 500 1000 1500

Surveyed March 1914 by H McK
Drawn April, 1914 " "
Traced by H McK
Checked " "

U.S. Engineer Office, Second Portland, Ore. District,
May 26, 1914.

Approved C. H. McKinstry
Lieut. Col. Corps of Engineers U.S. Army

To accompany Report to the Chief of Engineers, U.S. Army